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AUTHOR	Wiggins, Felita
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ABSTRACT

The Texas Natural Resource Conservation Commission (TNRCC) is the lead environmental agency for the State of Texas. It's charged is to oversee Texas natural resources: air, water, and waste management. The challenge is to manage these resources in a manner so that air and water are sustainable for the future and waste management is dealt with responsibly. The TNRCC developed a comprehensive training program for teachers in environmental education. The Teaching Environmental Science, (TES) course was developed in cooperation with Texas Southern University and other universities around the State of Texas. The Teaching Environmental Science course is a free environmental graduate summer course for K-8 teachers. The emphasis is on water, air, and waste issues that affect the local community. The course creates partnerships between teachers, local and state experts, and provides extensive environmental education materials and resources. This graduate course fosters an awareness of environmental concerns for the environment in urban areas. It also provides each teacher the knowledge base and the access to resources in order to become change agents in protecting and improving the environment. This paper will focus on the partnership, the planning, and the implementation of this graduate course at Texas Southern University. (Author)

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PLANNING AND IMPLEMENTING A GRADUATE ENVIRONMENTAL SCIENCE COURSE: A STATE AGENCY AND A UNIVERSITY PARTNERSHIP

MS. FELITA WIGGINS
TEXAS SOUTHERN UNIVERSITY
HOUSTON, TEXAS

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Planning and Implementing a Graduate Environmental Science Course: A State Agency and A University Partnership

Abstract

The Texas Natural Resource Conservation Commission (TNRCC) is the lead environmental agency for the State of Texas. It's charged is to oversee Texas natural resources: air, water, and waste management. The challenge is to manage these resources in a manner so that air and water are sustainable for the future and waste management is dealt with responsibly. The TNRCC developed a comprehensive training program for teachers in environmental education. The Teaching Environmental Science, (TES) course was developed in cooperation with Texas Southern University and other universities around the State of Texas. The Teaching Environmental Science course is a free environmental graduate summer course for K-8 teachers. The emphasis is on water, air, and waste issues that affect the local community. The course creates partnerships between teachers, local and state experts, and provides extensive environmental education materials and resources. This graduate course fosters an awareness of environmental concerns for the environment in urban areas. It also provides each teacher the knowledge base and the access to resources in order to become change agents in protecting and improving the environment. This paper will focus on the partnership, the planning, and the implementation of this graduate course at Texas Southern University.

The Partnership

The Texas Natural Resource Conservation Commission (TNRCC) in partnership with Texas Southern University (TSU) developed a graduate course, Teaching Environmental Sciences (TES). The Texas Natural Resource Conservation Commission is the lead environmental agency for the State of Texas. Its charge is to oversee Texas natural resources: air, water, and waste management. The challenge is to manage these resources in a manner so that air and water are sustainable for the future and waste management is dealt with responsibly. Texas Southern University is an institution of higher education. It was founded in 1947. It is a state-supported university, with eight schools and colleges. It is located in an urban community. The partnership between TSU and TNRCC began in 1995, and after eight years, this strong collaborative effort continues.

The goal of the TNRCC was to develop a graduate course, Teaching Environmental Sciences that would address state environmental issues on air, water and waste management, as it impacts local communities. Getting teachers to address environmental issues in the classroom presented a challenge. In the beginning, a support committee was organized. Local

environmental experts, scientists, teachers, and principals from various school districts surrounding the Houston area were called upon to act as an advisory panel for the class. These persons gave their support and voiced their concerns about the scope of the class. The TNRCC collaborated with TSU faculty and the Advisory Board to bring environmental practitioners from the field in specialized areas to the course .The Advisory Board examined the multifaceted learning opportunities and resources that were available in the local area. The TNRCC representatives along with the TSU professors outlined topics that were of local concern. This course emphasized the importance of teachers understanding real world environmental issues, especially those that affect the local community. There were shared values and a strong commitment from Texas Southern University to implement this course. The primary funding source for this course was the TNRCC with in kind services from TSU. Through the years, other agencies have contributed to the funding of the course, including The General Land Office and Houston Light and Power Company. The TNRCC's mission was to train teachers on environmental issues in the state of Texas. Texas Southern University served as an institutional bridge of higher learning to bring the state concerns

about environmental issues to the local community. These concerns were addressed through the formal training of teachers in the public schools. This training between TSU and TNRCC fostered an awareness and knowledge about the environment to teachers, who will teach and inspire the next generation of environmentally literate students. This partnership allowed the university to look at state and local environmental issues as a civic and social responsibility. The impact of teachers trained in this TES course led to local school reform on environmental education.

The TNRCC brings considerable expertise to this course. The education facilitator of the TNRCC course, and leading experts in environmental concerns, all played pivotal roles in the quality and implementation of this course. Texas Southern University College of Education faculty contributed to the instructional methodology of the course. TSU and TNRCC collaborated on the scope and sequence of the curriculum. The TNRCC helped to create partnerships between teachers, state and local agencies, giving the teachers the tools, as well as access to the expertise in the areas of air water and waste management.

Planning

The scope and sequence of the curriculum were planned in order to meet the specific instructional goals of the course. The units of instruction included broad areas of air, water, and waste management. The curriculum provided for lectures, field trips and hands-on experiences at various sites around the Houston area. TSU and the TNRCC acknowledged the varying levels of skills, and the backgrounds of the teachers who would attend the course. The incorporation of learning styles, and multiple intelligences accommodated the different types of learners in the classroom. Instructional methodologies were developed. Each area of air, water and waste management were analyzed to determine the scope of materials needed. This was an important phase in the planning process. This consideration strengthened the curriculum. The TNRCC's extensive publication site provided a wealth of resources materials. These included information guides on school recycling, composting, water monitoring, watersheds, storm drain stenciling, and air quality. The TNRCC served as a clearinghouse for materials and resources on environmental science.

Other components in planning included:

- Timeline for course
- Qualified participants
- Recruitment/brochures
- Resource materials
- Facilities
- Personnel: University Professor, Master Teacher
- Leading environmental experts: state local, non-profit agencies

The TES course is housed in the College of Education, Department of Curriculum and Instruction. The TES course ranges from an intensive two to three week period. This allows public school teachers to take advantage of attending the course. The TSU professor conducted lectures in the classroom. Interactive classes by the master teacher familiarized the teachers with the theoretical, as well as the methodologies on air, water and waste management. Local, state, and federal experts, along with non-profit agencies were invited to share their diverse knowledge on the environment with the teachers. Field site lectures by local professionals provided different perspectives on environmental issues being addressed. It included an on site analysis of the environmental problem. These planned site visits includes landfills, nature centers, bayous, school nature gardens, National Oceanic Atmospheric Administration (NOAA), and the Gulf Coast turtle

hatchery facility. Site visits to local industries were planned to give teachers insight of federal and state regulations. Having direct experiences outside the classroom, would allow the teachers to have hands on learning with the content being covered. These experiences give learning more meaning and allow the teacher to see its impact in the local community.

Implementation

How do you get teachers to teach environmental science? How do you raise their levels of concern and awareness about local environmental issues? These questions have challenged state agencies, universities, and schools. Teachers without the science background training have some insecurity in teaching environmental science. The primary mission of the TES course was to quell these insecurities. Teachers then would become aware and knowledgeable about local environmental issues, therefore engaged in teaching environmental science. The TES course is designed to increase the scientific literacy among teachers, who will in turn raise the consciousness of the students about protecting the environment. The content and methods of teaching were presented as an integrative undertaking into the formal school

curriculum. It would link the content subjects such as math, social studies, art, the natural sciences, and language arts into state and local standards. This will help teachers to address environmental issues through multiple disciplines and content areas. The TES course curriculum and resources strengthened teacher practices in environmental education in their classrooms, while allowing them to network with local and state experts, and community organizations. The university played a major role by serving as a catalyst, to stimulate interest in teaching environmental science to classroom teachers.

The Evaluation is an important part of assessing the overall success of a program. The evaluation instruments were tied to the Learner's Outcomes. Pre-Tests were given to access baseline knowledge and skill levels at the beginning of the course. At the end of the course post-tests were given to examine changes in cognitive levels. As a part of the teacher's evaluation, students had to develop original curricula. The TNRCC publishes selected lessons by teachers, on air, water, and waste management. Developed curriculum could be lesson plans, multi-disciplinary units, nature trail guides, outdoor environmental activities, and environmental websites, along with other creative project

activities. Developing lessons, gives the teachers a stake hold in teaching environmental science. The teachers bring increased knowledge and awareness of environmental issues to the classroom. Teacher's lessons, and activities, impact learning in their classroom and promotes changed student behaviors. Lessons published are posted on the TNRCC web site. Teachers made presentations to the class using one of their developed lesson activities. Teachers did evaluations to determine the effectiveness of the course. These evaluations helped to improve subsequent courses.

With the TNRCC leading the way through partnerships with TSU, it is clear that a knowledgeable citizenry of teachers on the environment is one that can make meaningful decisions about their environment, as it impacts their local community. The TES course continues to be an important factor that promotes changed attitudes and behaviors among teachers toward their environment, in the great state of Texas. The value of this course can also be seen through the numerous partnerships that teachers can make. The TES course is a valuable asset to the local urban community. With Texas Southern University and The Texas Natural Resource Conservation Commission as partners, with shared commitments

in improving the urban environment, the implementation of The Teaching Environment Science course will continue to be a successful endeavor.

References

For more information about the TES course, please contact the university for details.

Texas Southern University
TES Course
College of Education
3100 Cleburne Ave.
Houston, Texas 77004
713/313-7506

E Mail barnett wx@tsu.edu Dr. Wylma Barnett-University Professor

E-Mail fwwiggins@yahoo.com Ms. Felita Wiggins, M.S.-Master Teacher

Texas Natural Resource Conservation Commission — TES Course, Austin Texas@www.tnrcc.state.us.gov

A site visit to a landfill.

A golden silk spider.
A site visit to a forest ecosystem.

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Signature: Lemuel Berry Jr

Printed Name: Lemuel Berry, Jr.

Address: PO Box 325
Biddeford, ME 04005-0325

Date: 5/20/03

Position: Executive Director

Organization: NAAAS, NAHLS, NANAS, IAAS

Telephone No: 207-~~282-1925~~ 839-8004

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